# 386SX 16 20 25

# WRITE BACK MOTHERBOARD MANUAL

# CONTENTS

## CHAPTER 1 INTRODUCTION


1-1 Introduction ..... 1
1-2 Features ..... 2
1-3 Specification ..... 3
1-4 Board Layout ..... 4
1-5 Jumper Setting ..... 5


## CHAPTER 2 DESCRIPTION OF THE OPM386SX SYSTEM BOARD


2-1 System Bolock Diagram ..... 6
2-2 80386SX Microprocessor ..... 6
2-3 80387SX Math Coprocessor ..... 7
2-4 Expansion Slots ..... 7
2-5 Shadow RAM ..... 8
2-6 The OPM386SX Chip Set ..... 10


## CHAPTER 3 HARDWARE INSTALLATION


3-1 Building A System ..... 12
3-2 Installing Memory ..... 13
3-3 Math Coprocessor Insatllation ..... 15
3-4 Display Mode Select ..... 16
3-5 Peripheral Connections ..... 17
3-6 Case Connections ..... 20


## CHAPTER 4 SOFTWARE SETUP


4-1 Starting Up The System ..... 23
4-2 Memory Test Bypass ..... 24
4-3 To Run System Setup ..... 24
4-4 To Proceed BIOS Setup ..... 25
4-5 To Run The Standard Cmos Setup ..... 25
4-6 Modification of CMOS Setup ..... 27
4-7 To Run The Advanced Cmos Setup ..... 27
4-8 To Run The Advanced Chipset Setup ..... 29
4-9 Clearing The CMOS RAM ..... 31



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APPENDIX A I/O ADDRESS MAP ..... 32
APPENDIX B HARD DISK TYPE DETAILS ..... 33
APPENDIX C ERRORS REPORTED BY AMI-BIOS ..... 34
APPENDIX D SERVICE INFORMATION ..... 37

CHECKLIST

You main board package should contain the following:

* The OPM386SX mainboard
* This manual
* Short form for board layout

# CHAPTER 1

# INTRODUCTION

## 1-1 Introduction

This manual covers all necessary information to operate the OPM386SX system board. It will assist you the installation and configuration of a PC. Following the steps described in this manual , user should be able to handle the system without additional help.

The OPM386SX system board is an cost-effective compromise between the power of a 32-bit internal architecture and the convenience of full compatibility with the IBM PC/AT and OS/2. The board therefore allows the microprocessor to operate with all the advantages of a '386 system, with multi-tasking and multi-user capabilities.

Another important feature is the OPM386SX board composed with OPTi 82C283 chip set. So the OPM-386SX is speedy, function enhanced and more advance than the original 80386SX designs.

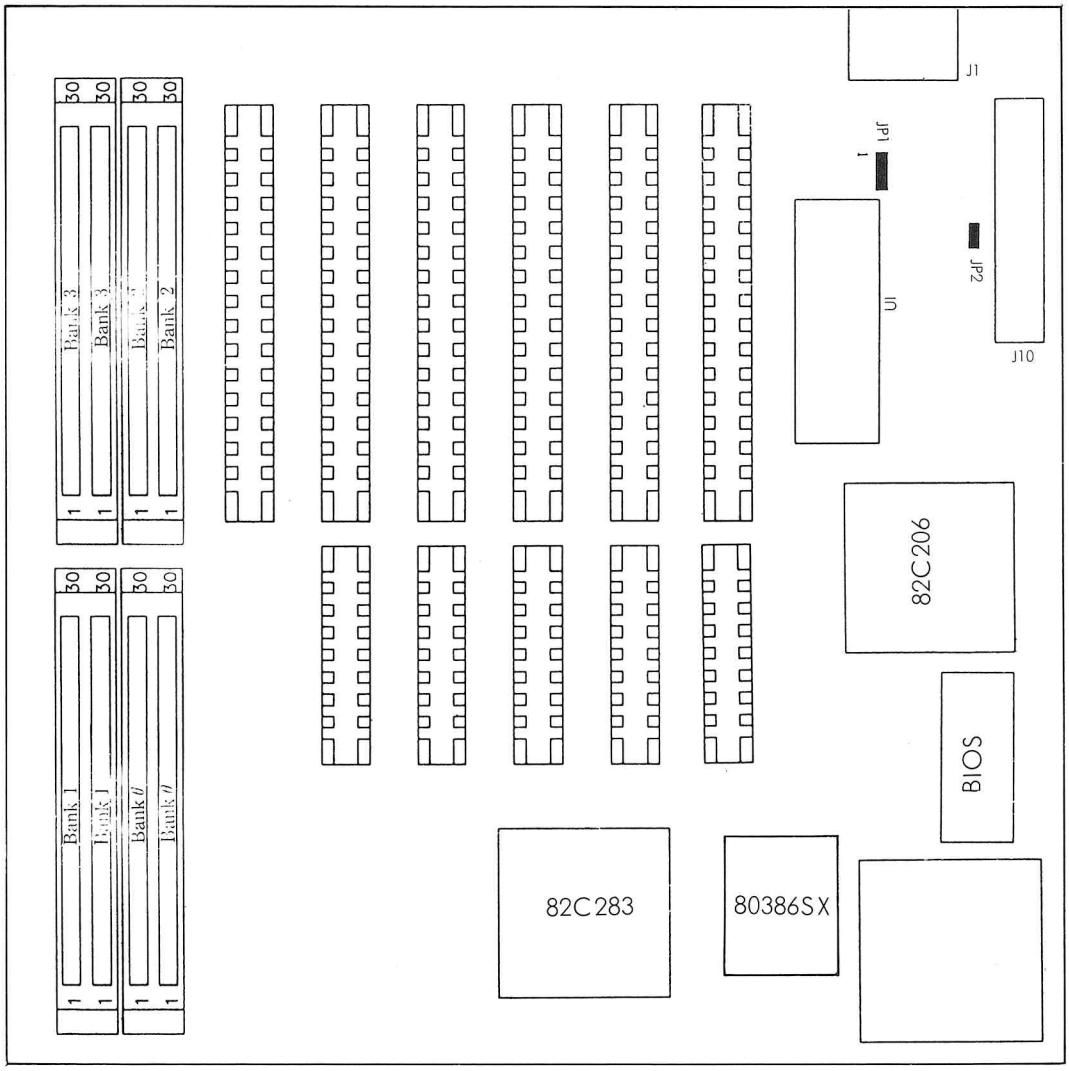
## 1-2 Features

* Intel 80386SX-20 (16,25) MHz Microprocessor.
* System speed would be adjusted by software or hardware.
* 8 bit single BIOS PROM.
* Optional for 80387SX math coprocessor socket.
* Page mode DRAM controller.
* Shadow RAM for BIOS and VIDEO ROM to improve performance.
* 256KB relocation to top of memory.
* Real time clock and calendar circuit Gate A20 Support .
* Sixteen interrupts.
* Seven DMA channel.
* Keyboard controller interface for an IBM-AT compatible

## 1-3 Specification

| | |
|---|---|
| Base board centeral processor | : 80386SX - 20 (16,25) |
| Main memory | |
| On board memory model | : 1M,2M,3M,4M,5M,6M,8M,9M<br>10M,12M,16M |
| Maximum memory | : 16M |
| DRAM access cycle time | : 100ns for 20 ( 16 )MHz<br>80ns for 25 MHz |
| Memory type | : SIM module |
| Data bus width | : 16 bits |
| Corprocessor | : Synchronous model running at CPU clcok |
| I/O slots | : 6 expansion<br>16 bits * 5<br>8 bits * 1 |
| Environment | |
| Ambient temperature | |
| operating | : 0 to +55 C |
| non - operating | : -30 to +70 C |
| Relative Humidity | : 0 to +85 %<br>noncondensing at +55 C |
| Altitude | : 0 to 10,000 feet |
| Vibration | : ramdom variation<br>0 to 1000 Hz |
| Physical characteristics | : 233<br>220 |
| Power requirememts | |
| voltage and tolerance | : +5V + - 5 % |
| nominal current | : 11.5 A |
| watts | : 180 W |

## 1-4 Board Layout



## 1-5 Jumper Setting

JP1-Display Mode Sekect

OPEN:Mono Close:Color

JP2-CMOS RESET Jumper

1-2:Reset CMOS 2-3:Normal Mode

J8 - External Battery Connector

KEYLOCK - Keyboard Inhibited And Power On LED Indicator Connector

SPEAKER - Speaker Connector

TURBO LED - Turbo LED Indicator Connector

RESET - Reset Connector (S1)

TURBO SW - Turbo switch connector (S2)

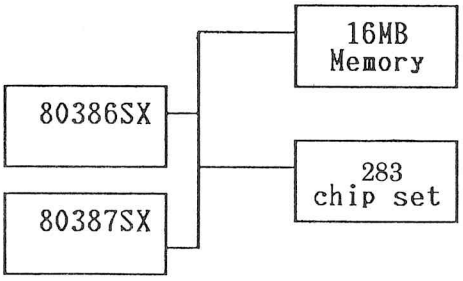
J1 - Keyboard Connector

J9、J10 - Power Supply Connector

# CHAPTER 2

# DESCRIPTION OF THE OPM386SX SYSTEM BOARD

## 2-1 System Block Diagram




## 2-2 80386SX Microprocessor

The 80386SX microprocessor is a 32-bit CPU with a 16-bit external data bus and a 24-bit external address bus. The 386SX CPU brings the high-performance software of the Intel 80386 architecture to mid-range systems. It provides the performance benefits of a 32-bit programming architecture with the cost saving associated with 16-bit hardware system.

The 386SX microprocessor is 100% object code compatible with 386,286 and 8086 microprocessor. Systems based on the 386SX CPU can access the world's largest existing microcomputer software base, including the growing 32-bit software base. Only the Intel 80386 architecture can run Unix, OS/2 and MS-DOS.

## 2-3 80387SX Math Coprocessor

The 80387SX math coprocessor is an integrated circuit that enables the system to perform high-speed arthmetic,logarithmic,and trigonometric operations. The coprocessor works in parallel with the microprocessor. The parallel operation decreases operating time by allowing the coprocessor to do mathematical calculations while the microprocessor continues to do other functions.

The OPM386SX has a socket (U29) for an 80387SX math coprocessor. If an 80387SX chip is to be installed, make sure that it is clock speed compatible with the OPM386SX. The 80387SX-20 is required if the system is to operate at 20 MHz. Refer to the 3-3 section for math coprocessor installation.

## 2-4 Expansion slots

The OPM386SX has a modified eigth slot AT expansion bus. The bus is comprised of one 8-bit expansion slot and five slots 16-bit expan-sion slots. These will accept all the common expansion cards that con-form to the standard slots. You should check to make sure that any cards added are speed compatible with the OPM386SX.

*** 8-bit Expansion Slots ***

J2 are the IBM PC - and XT - compatible expansion slots; they have 62 pins divided into two columns of 31 each. Each can address up to 1M bytes and allow 8-bit data transfers.

*** 16-bit Expansion Slots ***

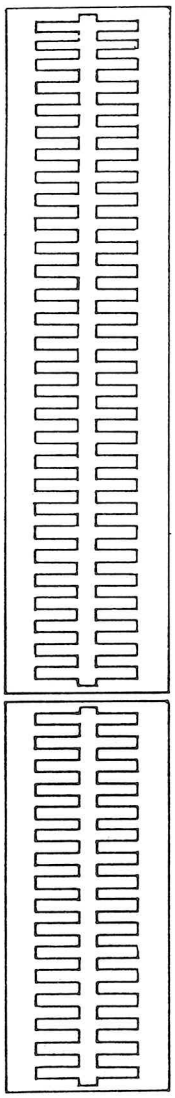
The seven 16-bit expansion slots that increase address ability to 16M bytes and enable 16-bit data transfers. They will commonly be used by cards. such as hard disk controllers, network cards and many I/O expansion cards. The slots are of two-piece construction with one long section and one short. The long sections are the same as the 8-bit slots. The additional short sections have 36 pins divided into two columns of 18 each. These two sections together make up a 16-bit data path. Cards that use these slots must be plugged fully into both sections of the slot.

## 2-5 Shadow RAM

If you have 1MB or more of memory installed it is possible to use a feature of the OPM386SX's chip set called "Shadow RAM". This feature allows the relocation of the ROM BIOS to a memory location in RAM above 640K. This option copies data from slower memory devices such as ROMs into RAM, since access to local RAM is much faster than ROM.

The greatest advantage of the shadowing option is to speed up memory access to BIOS, and the disadvantage of this option is to occupy much memory space. ( reduce 128KB memory size )

# Expansion Slots Pin Assignments

| Signal | | Pin | Slots | Pin | Singal | |
|---|---|---|---|---|---|---|
| Ground | | B1 |  | A1 | – I/O CH CK | (I) |
| Reset Drive | (O) | B2 | | A2 | SD7 | (I/O) |
| + 5V DC | | B3 | | A3 | SD6 | (I/O) |
| IRQ9 | (I) | B4 | | A4 | SD5 | (I/O) |
| – 5V DC | | B5 | | A5 | SD4 | (I/O) |
| DRQ2 | (I) | B6 | | A6 | SD3 | (I/O) |
| – 12V DC | | B7 | | A7 | SD2 | (I/O) |
| OWS | (I) | B8 | | A8 | SD1 | (I/O) |
| + 12V DC | | B9 | | A9 | SD0 | (I/O) |
| Ground | | B10 | | A10 | – I/O CH RDY | (I) |
| – SMEMW | (O) | B11 | | A11 | AEN | (O) |
| – SMEMR | (O) | B12 | | A12 | SA19 | (I/O) |
| – IOW | (I/O) | B13 | | A13 | SA18 | (I/O) |
| – IOR | (I/O) | B14 | | A14 | SA17 | (I/O) |
| – DACK3 | (O) | B15 | | A15 | SA16 | (I/O) |
| DRQ3 | (I) | B16 | | A16 | SA15 | (I/O) |
| – DACK1 | (O) | B17 | | A17 | SA14 | (I/O) |
| DRQ1 | (I) | B18 | | A18 | SA13 | (I/O) |
| – Refresh | (I/O) | B19 | | A19 | SA12 | (I/O) |
| CLK | (O) | B20 | | A20 | SA11 | (I/O) |
| IRQ7 | (I) | B21 | | A21 | SA10 | (I/O) |
| IRQ6 | (I) | B22 | | A22 | SA9 | (I/O) |
| IRQ5 | (I) | B23 | | A23 | SA8 | (I/O) |
| IRQ4 | (I) | B24 | | A24 | SA7 | (I/O) |
| IRQ3 | (I) | B25 | | A25 | SA6 | (I/O) |
| – DACK2 | (O) | B26 | | A26 | SA5 | (I/O) |
| T/C | (O) | B27 | | A27 | SA4 | (I/O) |
| BALE | (O) | B28 | | A28 | SA3 | (I/O) |
| + 5V DC | | B29 | | A29 | SA2 | (I/O) |
| OSC | (O) | B30 | | A30 | SA1 | (I/O) |
| Ground | | B31 | | A31 | SA0 | (I/O) |
| – MEMCS16 | (I) | D1 | | C1 | SBHE | (I/O) |
| – I/O CS16 | (I) | D2 | | C2 | LA23 | (I/O) |
| IRQ10 | (I) | D3 | | C3 | LA22 | (I/O) |
| IRQ11 | (I) | D4 | | C4 | LA21 | (I/O) |
| IRQ12 | (I) | D5 | | C5 | LA20 | (I/O) |
| IRQ15 | (I) | D6 | | C6 | LA19 | (I/O) |
| IRQ14 | (I) | D7 | | C7 | LA18 | (I/O) |
| – DACK0 | (O) | D8 | | C8 | LA17 | (I/O) |
| DRQ0 | (I) | D9 | | C9 | – MEMR | (I/O) |
| – DACK5 | (O) | D10 | | C10 | – MEMW | (I/O) |
| DRQ5 | (I) | D11 | | C11 | SD8 | (I/O) |
| – DACK6 | (O) | D12 | | C12 | SD9 | (I/O) |
| DRQ6 | (I) | D13 | | C13 | SD10 | (I/O) |
| – DACK7 | (O) | D14 | | C14 | SD11 | (I/O) |
| DRQ7 | (I) | D15 | | C15 | SD12 | (I/O) |
| + 5V DC | | D16 | | C16 | SD13 | (I/O) |
| – Master | (I) | D17 | | C17 | SD14 | (I/O) |
| Ground | | D18 | | C18 | SD15 | (I/O) |

## 2-6 The OPM386SX chip set

The OPM386SX chip set from OPTi allows the programming of many system board functions. The chip set consists of the 82C283 and 82-C206. The descriptions below are somewhat technical and are provided for those interested in the specific functions the individual chips in the set.

*** The 82C283 Chip ***

The 82C281 is a highly integrated AT system logic VLSI for high end 386SX AT systems. It integrates the logic for local DRAM control , AT bus control, cache memory control and data bus control.

The 82C283 has been designed to support pipeline mode for systems.

*** The 82C206 Chip ***

The 82C206 is a LSI implementation of the standard peripherals required to implement an IBM PC/AT system board. It is fully compatible to Intel's 8237 DMA controller, 8259 interrupt controller, 8254 timer/counter channels, 13 interrupt request channels, 2 timer/counter channels, and a real-time clock. The 82C206 provides all of the standard peripherals required for a system board implementation except the keyboard interface controller.

The DMA controllers are cascaded together to service seven DMA DMA channels. Each of the seven channels is assigned a unique I/O address:

| Channel | I/O Address | Function |
|---|---|---|
| 0 | 0087 | spare |
| 1 | 0083 | SDLC |
| 2 | 0081 | Diskette adapter |
| 3 | 0082 | spare |
| 4 | cascading | cascading for DMA controller 1 |
| 5 | 0088 | spare |
| 6 | 0089 | spare |
| 7 | 008A | spare |

# CHAPTER 3

# HARDWARE INSTALLION

This chapter describes the equipment you need to create a working system around the main board. It also describes how to install the math coprocessor, how to install the SIM DRAM to system board and how to install the OPM386SX system board in a case.

## 3-1 Building A System

To build a system based on the OPM386SX board, you must obtain the following equipmentes:

* OPM386SX system board.
* A chassis to hold all the system components.
* AT compatible power supply with power good signal.
* AT compatible keyboard.
* Display card.
* Monitor.
* A Hard/Floppy disk controller with cables connected to driver.
* At least one floppy ( Hard ) disk drive.
* Any other XT/AT compatible equipment, such as serial port, parallel port, mouse, printer, plotter, faxcard, LANcard, etc.

## 3-2 Installing Memory

There are 4 banks inside this OPM386SX main board for inserting DRAM. DRAM type use DRAM type use SIM Module.Therefore maxium memory on borad can be 16M bytes. Please pay attention to the direction between pinout and socket when you install memory. Following figure gives a detailed description of memory installation.

| System Clock | DRAM Access Time |
|---|---|
| 16 MHz | 100 ns |
| 20 MHz | 100 ns |
| 25 MHz | 80 ns |

Note : The workable on board memory size should not be below 1M byte.

The 82C283 memory controller has the following features:

◦ Flexible DRAM Banks Configuration. The 82C283 supports 256k,1M, and 4M size DRAM. Total memory can be up to 16MB. 12 memory configurations are supported..

| Bank0 | Bank1 | Bank2 | Bank3 | Total |
|---|---|---|---|---|
| 256K | 256K | - | - | 1M |
| 256K | 256K | 256K | 256K | 2M |
| 1M | - | - | - | 2M |
| 256K | 256K | 1M | - | 3M |
| 1M | 1M | - | - | 4M |
| 256K | 256K | 1M | 1M | 5M |
| 1M | 1M | 1M | - | 6M |
| 1M | 1M | 1M | 1M | 8M |
| 256K | 256K | 4M | - | 9M |
| 1M | 4M | - | - | 10M |
| 1M | 1M | 4M | - | 12M |
| 4M | 4M | - | - | 16M |

Bank0 U13、U14

Bank1 U11、U12

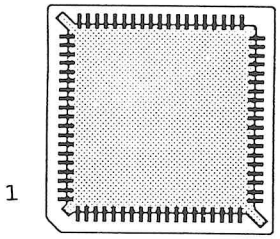
Bank2 U8、U9

Bank3 U6、U7

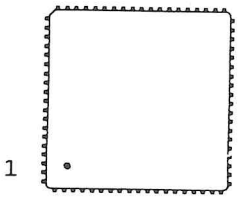
## 3-3 Math Coprocessor Installation

If a math coprocessor is installed then the calculation of operation of OPM386SX could be speeded up. Please refer to the socket and 80387SX outline of following figure before you install 80387SX.

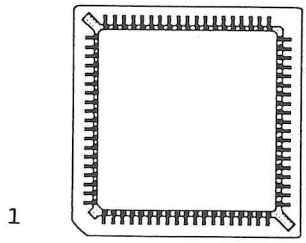
U29 is a socket of 80387SX. This socket has 68 pins and looks like a box. 80387SX is a 68 pins PLCC packed rectangular chip. Please pay attention to the correct direction between pin 1 of 80387SX and pin 1 of soket during insertion of 80387SX into U29 soket. Please be sure that the pins of 80387SX should line orderly. You could insert it into U36 when you confirm above conditions. Special tools should be used to remove 80387SX.




80387sx
socket



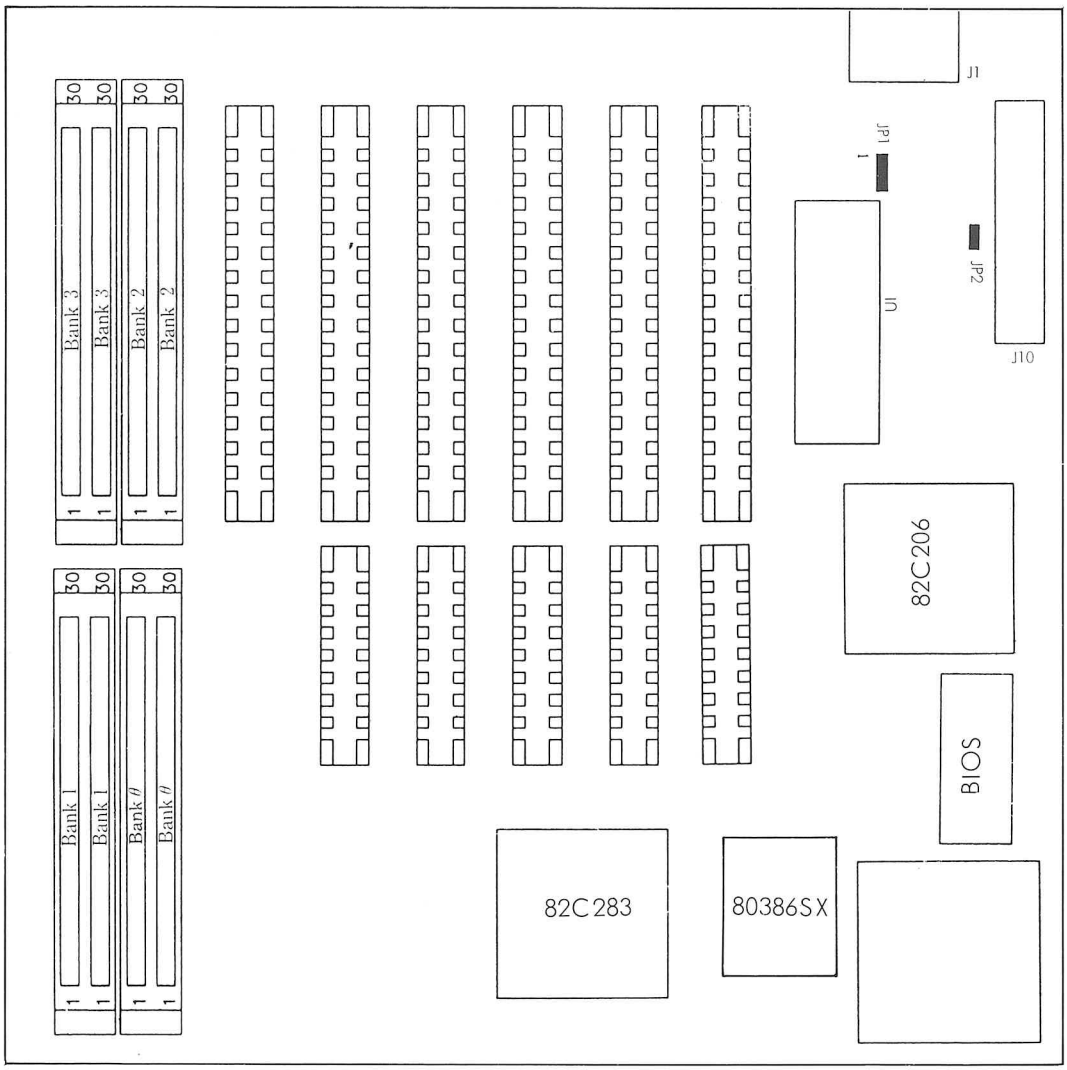

80387sx



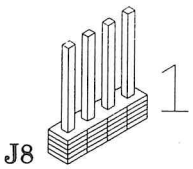

80387sx installed

## 3-4 Display Mode Select

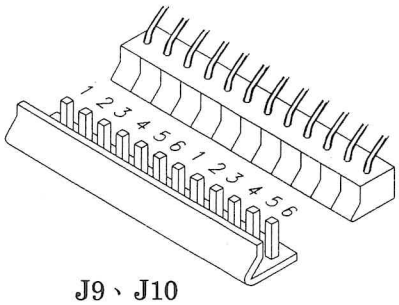
JP1
close:color
open:mono



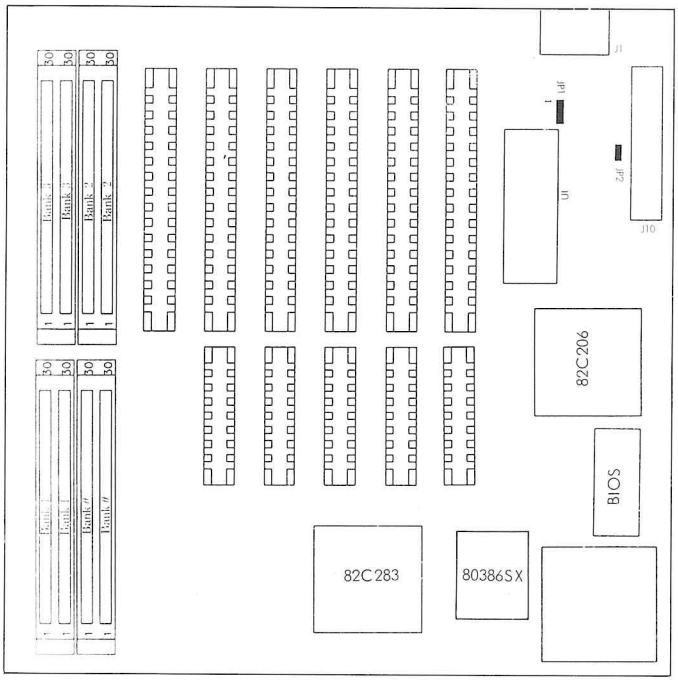
## 3-5 Peripheral Connections




J8




J9、J10



****** Power Supply ******

The power supply connector on the OPM80386SX is made up of two six-pin male components in a line. The two female connectors of the power supply must be attached in the correct order. In order to find out the location of power connector and connection method, please refer to following figure.

| SIGNAL / FUNCTION | COLOR | POWER PIN # |
|---|---|---|
| Power Good | ORG | 1 |
| + 5 V | RED | 2 |
| + 12 V | YEW | 3 |
| - 12 V | BLU | 4 |
| Ground | BLK | 5 |
| Ground | BLK | 6 |
| Ground | BLK | 1 |
| Ground | BLK | 2 |
| - 5 V | WHT | 3 |
| + 5 V | RED | 4 |
| + 5 V | RED | 5 |
| + 5 V | RED | 6 |

****** Keyboard Connector ******

KB1 is a 5 pins AT compatible keyboard connector. The connecting jack from the keyboard plugs directly into it after the board has been installed in the system unit case.

| SIGNAL / FUNCTION | KB1 PIN # |
|---|---|
| KEYCLK ( Clock ) | 1 |
| KEYDAT ( Data ) | 2 |
| N/C | 3 |
| Ground | 4 |
| + 5 V | 5 |

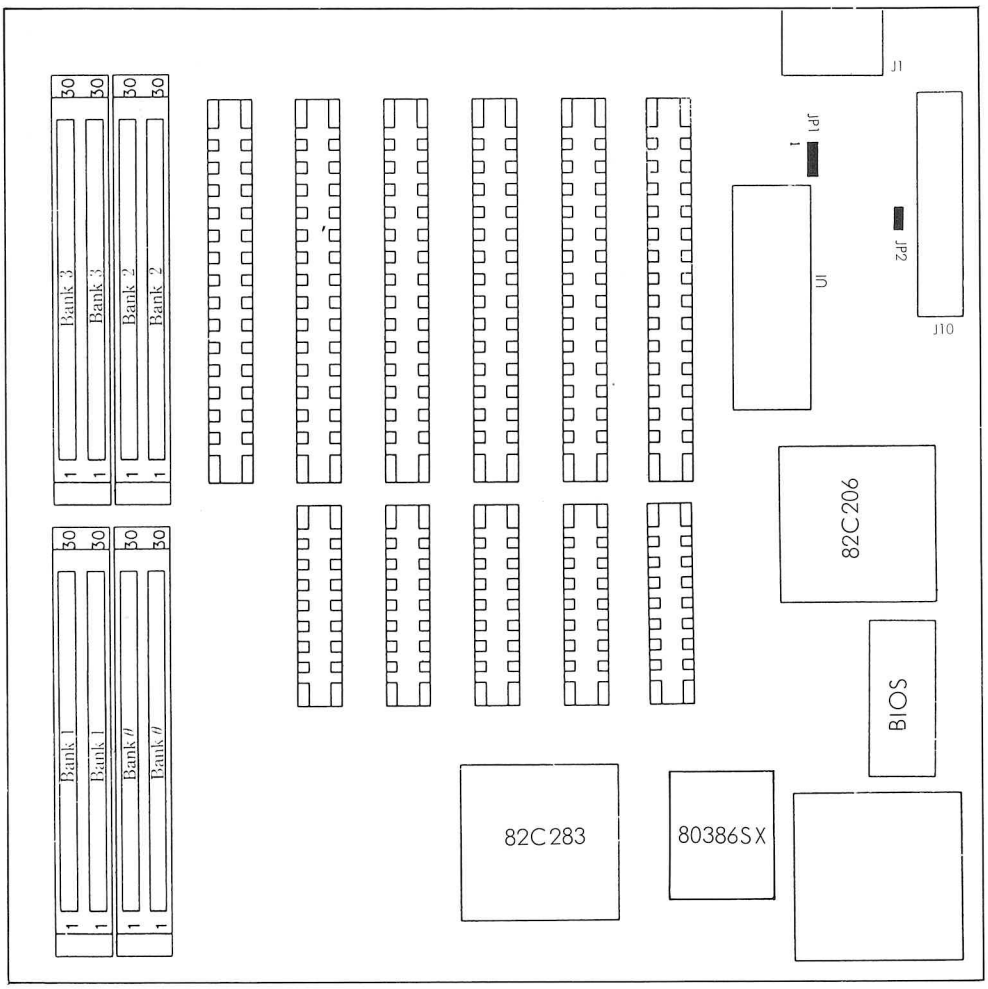
## ****** External Battery Connector (J8) ******

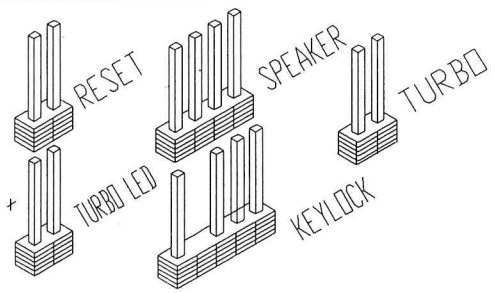
There is an internal battery already inside OPM80386SX. This internal battery will charge automatically as you turn the system power on . But please be understood that it will discharge as you turn the system power off. So one month or later system configuration will loss because this internal battery has discharged all electicity. It will take six to twelve hours to recharge the inter nal battery as you turn on the system power again. in order to prevent from above phenomena, you could connect an external battery when you do not use this system.

| SIGNAL / FUNCTION | J8 PIN # |
|---|---|
| Battery ( + ) | 1 |
| Key ( Pin removed ) | 2 |
| Ground ( - ) | 3 |
| Ground ( - ) | 4 |

## 3-6 Case connections

There are five connectors on the OPM80386 that can be attached to indicators or devices on a system case if they are presented. Following are these five connectors :



## * * * Turbo Switch Connector (TURBO SW) * * *

The speed of the system can be changed by either the software or the haedware switch.

a. Setting system speed by hardware:

TURBO SW jumper for setting system speed by hardware.

b. Setting system speed by software:

| MODE | PRESSING |
|---|---|
| NORMAL | Hold down the <Ctrl> and <Alt> keys and the press the < - > key |
| TURBO | Hold down the <Ctrl> and <Alt> keys and the press the < + > key |

## * * * Reset Connector (Reset) * * *

There are two ways to reset system. One is hardware reset. The other is software reset.

| RESET BY | MEDIA | SET / PRESSING |
|---|---|---|
| Hardware | Jumper ( RESET ) | Set short for RESET |
| Software | Keyboard | Hold down the <Ctrl> and <Alt> keys and the press the <Del> key. |

****** Turbo LED Connector (TURBO LED) ******

It indicates Turbo mode (high speed) when TURBO LED lights. Otherwise it indicates Normal mode (low speed) when TURBO LED does not light.

****** Speaker Connector (Speaker) ******

"Speaker" is a speaker connector. Following are specifications of pinout :

| Signal/Function | Pin |
|---|---|
| Speacker Drive Out | 1 |
| Key(Pin Removed) | 2 |
| Ground | 3 |
| +5v | 4 |

****** Keylock Connector (Keylock) ******

There are two functions of keylock connector. One is keyboard inhibition. (pin 4 and pin 5). The other one is power on indication by LED (pin 1 and pin 3). The keyboard will be locked when pin 4 and pin 5 short so that no data could be keyed in. The specifications of keylock connector pin-out are below :

| SIGNAL / FUNCTION | KEYLOCK PIN # |
|---|---|
| Power For LED Power-ON Light | 1 |
| Key ( Pin Removed ) | 2 |
| Ground | 3 |
| Keylock | 4 |
| Ground | 5 |

# CHAPTER 4

# SOFTWARE SETUP

From this chapter, you will learn how to modify data inside CMOS RAM. User is permited to change data inside CMOS RAM by a CMOS Setup programme which is provided by BIOS. In general, you need not to modify the configuration in CMOS RAM, unless following cases happen:

* CMOS options not set
* Memory size mismatch.
* Hard Disk or Floppy Disk type set-up error
* Display Configuration mismatch
* CMOS battery is low.
* To increase Hard disk of Floppy disk driver.
* Change video or BIOS shadow to enable or disable.

## 4-1 Starting up the system

Turn on the system and wait for the reaction of BIOS. A few minutes later screen will come out.

```
ROM * BIOS (C) 1990 American Megatrends Inc.,
xxxxx KB OK
Hit<ESC> ,If you want to run SETUP


                        (C) American Megatrends Inc.,
```

## 4-2 Memory Test Bypass

The BIOS performs diagnostics of the system and displays the size of the memory being tested. Please be noticed that you can bypass the memory test by pressing the <ESC> key. This option would be quite useful when the memory on the system is quite large. You should hit the <ESC> key when the message "Press <ESC> key to bypass MEMORY test" appears on the screen.

## 4-3 To run System Setup

The message "Press <DEL> if you want to run SETUP utility" appears on screen as you finish memory test. So you can press <DEL> key to enter system Setup programme.

(A). If there is no error in BIOS initialization or the <DEL> key has not been pressed, then the system will be booted and either hard disk or floppy disk be access.

(B). Error message will appear on screen when errors happen in BIOS. There are two styles of error message. Following are :

| T Y P E 1 | T Y P E 2 |
|---|---|
| CH-2 Timer Error<br>Keyboard Error<br>KB/Interface Error<br>INTR#2 Error<br>Display Switch not proper<br>Keyboard is locked ...Unlock It<br>FDD Controller failure<br>HDD controller failure<br>C: Driver Error<br>D: Driver Error | CMOS Battery State Low<br>CMOS System Options Not Set<br>CMOS Checksum failure<br>CMOS Memory Size Mismatch<br>CMOS Time & Data Not Set<br>CMOS Display Type Mismatch<br>C: Driver failure<br>D: Driver failure |

If any one of type 1 error happens, then screen will display following message:

Press <F1> to RESUME

After pressing <F1>, the system will be booted and either hard disk or floppy disk be accessed.

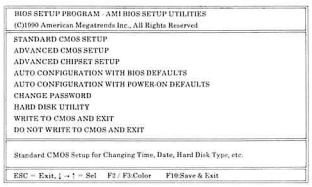
If any one of type 2 error happens, then screen will display following message:

Run Setup Utility
Press <F1> to RESUME

Press <F1> key to enter BIOS Setup programme.

## 4-4 To proceed BIOS Setup

As you do BIOS Setup, the screen will display following message:


BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
(C)1990 American Megatrends Inc., All Rights Reserved
STANDARD CMOS SETUP
ADVANCED CMOS SETUP
ADVANCED CHIPSET SETUP
AUTO CONFIGURATION WITH BIOS DEFAULTS
AUTO CONFIGURATION WITH POWER-ON DEFAULTS
CHANGE PASSWORD
HARD DISK UTILITY
WRITE TO CMOS AND EXIT
DO NOT WRITE TO CMOS AND EXIT
Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.
ESC = Exit, ↓ → ↑ = Sel F2 / F3:Color F10:Save & Exit

Press <↑> or <↓> key to select, and press < Enter > to confirm.

## 4-5 TO RUN the STANDARD CMOS SETUP

Move the highlight bar to STANDARD CMOS SETUP option by pressing the <↑> or <↓> key and press <Enter> key to confirm. The next screen will show the following:

BIOS SETUP PROGRAM - STANDARD CMOS SETUP

(C)1990 American Megatrends Inc., All Rights Reserved

| | | | | |
|---|---|---|---|---|
| Date (mn / date / year) | : Fri, May 24,1991 | | Base memory | : 640 KB |
| Time (hour / min / sec) | : 11 : 51 : 28 | | Ext. memory | : 256 KB |
| Daylight saving | : Disabled | Cyln Head | WPcom LZone Sect Size | |
| Hard disk C: type | : 33 | 1024 5 | 1024 1024 17 43 MB | |
| Hard disk D: type | : Not Installed | | | |
| Floppy drive A: | : 1.2 MB, 5, " | | | |
| Floppy drive B: | : Not Installed | | | |
| Primary display | : VGA / PGA / EGA | | | |
| Keyboard | :Installed | | | |

| Month | : Jan, Feb,.....Dec |
|---|---|
| Date | : 01, 02, 03,...31 |
| Year | : 1901, 1902,...2099 |

ESC = Exit, ↓ → ↑ = Sel F2 / F3:Color PU / PD:Modify

| Sun | Mon | Tue | Wed | Fri | Thu | Sat |
|---|---|---|---|---|---|---|
| 28 | 29 | 30 | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |

This menu divides into three parts. The right side shows the status. The lower left shows the instructions. The upper left shows the items which can be selected and there is a blink cursor on this part to wait for input.

User can take the <↑>, <↓>, <←>, <→> keys for selecting items, the <PgUp>, <PgDn> keys to modify and <ESC> to leave this screen. Once the item selected, there will be a highlight area in option field to recommemd other options.

## 4-6 Modification of CMOS Setup

AMI BIOS Setup utilities provide a screen menu that is very easy to operate. It does not require user to have any special skill to operate it. Following is an example to learn the modification of "Floppy drive A".

Step 1 : Use <↑> or <↓> key to move highlight bar to position of "Floppy drive A". Then use <PgUp> or <PgDn> to select required Drive Type.

Step 2 : After above selection, press <ESC> key. Then screen will display following message :

Write data into CMOS and exit (Y/N) ?

Step 3: Press "Y" to confirm, or "N" to return to Setup. If you type "Y', the Setup programme will write the updated data into CMOS and reset the system.

## 4-7 TO RUN the ADVANCED CMOS SETUP

Move the highlight bar to ADVANCED CMOS SETUP option by pressing the <↑> or <↓> key and press <Enter> key to confirm. The next screen will show the following:

BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
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| | | | |
|---|---|---|---|
| Typematic Rate Programming | : Disabled | Password Checking Option | : Disabled |
| Typematic Rate Delay (msec) | : 250 | Video ROM Shadow C000,16K | : Enabled |
| Typematic rate (Chars / Sec) | : 10.0 | Video ROM Shadow C400,16K | : Enabled |
| Above 1 MB Memory Test | : Disabled | Adaptor ROM Shadow C800,16K | : Disabled |
| Memory Test Tick Sound | : Enabled | Adaptor ROM Shadow CC00,16K | : Disabled |
| Memory Parity Error Check | : Enabled | Adaptor ROM Shadow D000,16K | : Disabled |
| Hit <ESC> Message Display | : Enabled | Adaptor ROM Shadow D400,16K | : Disabled |
| Hard Disk Type 47 RAM Area | : 0:300 | Adaptor ROM Shadow D800,16K | : Disabled |
| Wait For <F1> If Any Error | : Enabled | Adaptor ROM Shadow DC00,16K | : Disabled |
| System Boot Up Num Lock | : On | Adaptor ROM Shadow E000,16K | : Disabled |
| Numeric Processor | : Absent | Adaptor ROM Shadow E400,16K | : Disabled |
| Floppy Drive Seek At Boot | : Disabled | Adaptor ROM Shadow E800,16K | : Disabled |
| System Boot Up Sequence | : C:, A: | Adaptor ROM Shadow EC00,16K | : Disabled |
| System Boot Up CPU Speed | : High | System Rom Shadow F000,64K | : Enabled |

ESC = Exit, ↓ → ↑ = Sel (Ctrl)Pu / Bd:Modify F1:Help F2 / F3:Color
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults

Note The OPM386SX reserves the area from 0F0000H to 0FFFFFH for system BIOS to use it as shadow RAM. The area from 0C0000h to 0CFFFFH is reserved for video BIOS to use it as shadow RAM. So this area from 0C0000H to 0Cffffh will be used as video BIOS shadow enable. Please check the BIOS of Interface Card (Addon Card) to see whether the BIOS uses this 0C0000H to 0CFFFFH area or not. If so, please adjust to other address before use it. This action will prevent from abnormal operation because of the collision of video BIOS shadow RAM and Interface Card BIOS. Another method is to disable Video BIOS shadow .

## 4-8 TO RUN the ADVANCED CHIPSET SETUP

Use either the <↑> or <↓> key to switch back and forth between different option.

After ADVANCED CHIPSET SETUP is selected. A warning screen will then be seen Hit <Enter> to continue, then the following screen will appear.

| BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP<br>(C)1990 American Megatrends Inc., All Rights Reserved | |
|---|---|
| DRAM Read Wait State | : 0 W / S |
| DRAM Write Wait StATE | : 0 W / S |
| ATCLK Select | : CLK2 / 4 |
| 256 KB Memory Relocation | : Enabled |
| ESC = Exit, ↓ → ↑= Sel (Ctrl)Pu / Pd:Modify<br>F5:Old Values F6:BIOS Setup Defaults | F1:Help F2 / F3:Color<br>F7:Power-On Defaults |

1. ATCLK Set CLK2 / 4
2. ATCLK Set CLK2 / 6
3. When the system is power on, no matter you select shadow RAM enable or disable, memory testing will show a decrease of 128KB. It is because the OPM386SX has reserved this 128KB area for system BIOS and video BIOS to use it as shadow RAM. A decrease of 384KB will happen if "256KB memory reloc" of CMOS Setup is setted to disable.

## 4-9 Clearing The CMOS RAM

Once there is error in CMOS setup configuration, system will be hanged up. We provide two methods to clear data inside CMOS RAM and allow you to renew it.

* * * Software CMOS Reset * * *

Using the keyboard to clear the CMOS RAM, do the following :

1. Turn the system off.(Power Off)
2. Hold down the <Insert> key and turn the system on.

After you have done above to clear the CMOS RAM, you could enter the correct configuration values using the CMOS Setup program.

* * * Hardware CMOS Reset * * *

At first turn off system, and then take out the jumper cap of JP2 pin 2,3 and change to pin 1, 2. About 3 minutes later, put the jumper back to the original location of JP2 pin 2, 3. The CMOS RAM is cleared at this moment. You could turn on the system again to setup CMOS with the correct values.

Note:

1."Auto Configuration with Bios Defaulfs"

The Default Valve depend by PC Maker.

2."Auto Configuration with Power-on Defaults"User Don't care.

# APPENDIX A

## I/O ADDRESS MAP

| HEX RANGE | D E V I C E S | USAGE |
|---|---|---|
| 000 - 01F | DMA controller 1, 8237A-5 | System |
| 020 - 03F | Interrupt controller 1, 9259A | System |
| 040 - 05F | Timer, 8254-2 | System |
| 060 - 06F | 8042 ( Keyboard ) | System |
| 070 - 07F | Real Time Clock, NMI Mask | System |
| 080 - 09F | DMA Page Register 74LS612 | System |
| 0A0 - 0BF | Interrupt Controller 2, 8259A | System |
| 0C0 - 0DF | DMA Controller 2, 8237A-5 | System |
| 0F0 | Clear Math Coprocessor Busy | System |
| 0F1 | Reset Math Coprocessor | System |
| 0F8 - 0FF | Math Coprocessor | System |
| 1F0 - 1F8 | Fixed Disk | I/O |
| 200 - 207 | Game I/O | I/O |
| 278 - 27F | Parallel Printer Port 2 | I/O |
| 2F8 - 2FF | Serial Port 2 | I/O |
| 300 - 31F | Prototype Card | I/O |
| 360 - 36F | Reserved | I/O |
| 378 - 37F | Parallel Printer Port 1 | I/O |
| 380 - 38F | SDLC Bisynchronus 2 | I/O |
| 3A0 - 3AF | Bisynchron Momochrome Display And | I/O |
| 3B0 - 3BF | Monochrome Display And Printer Adapter | |
| 3C0 - 3CF | Reserved | |
| 3D0 - 3DF | Color/Graphic Monitor Adapter | I/O |
| 3F0 - 3F7 | Floppy Diskette Controller | I/O |
| 3F8 - 3FF | Serial Port 1 | I/O |

# APPENDIX B

# HARD DISK TYPE DETAILS

| Disk Type Details | | | | | |
|---|---|---|---|---|---|
| Type | Cylinders | Heads | Write-precomp | Landing-zone | Capacity |
| 1 | 306 | 4 | 128 | 305 | 10 MB |
| 2 | 615 | 4 | 300 | 615 | 21 MB |
| 3 | 615 | 6 | 300 | 615 | 31 MB |
| 4 | 940 | 8 | 512 | 940 | 64 MB |
| 5 | 940 | 6 | 512 | 940 | 48 MB |
| 6 | 615 | 4 | NONE | 615 | 21 MB |
| 7 | 462 | 8 | 256 | 511 | 31 MB |
| 8 | 733 | 5 | NONE | 733 | 31 MB |
| 9 | 900 | 15 | NONE | 901 | 115 MB |
| 10 | 820 | 3 | NONE | 820 | 21 MB |
| 11 | 855 | 5 | NONE | 855 | 36 MB |
| 12 | 855 | 7 | NONE | 855 | 51 MB |
| 13 | 306 | 8 | 128 | 319 | 21 MB |
| 14 | 733 | 7 | NONE | 733 | 44 MB |
| 15 | 000 | 0 | 000 | 000 | 00 MB |
| 16 | 612 | 4 | ALL CYLS. | 663 | 21 MB |
| 17 | 977 | 5 | 300 | 977 | 42 MB |
| 18 | 977 | 7 | NONE | 977 | 58 MB |
| 19 | 1024 | 7 | 512 | 1023 | 61 MB |
| 20 | 733 | 5 | 300 | 732 | 31 MB |
| 21 | 733 | 7 | 300 | 732 | 42 MB |
| 22 | 733 | 5 | 300 | 733 | 31 MB |
| 23 | 306 | 4 | ALL CYLS. | 336 | 10 MB |
| 24 | 925 | 7 | ALL CYLS. | 925 | 56 MB |
| 25 | 925 | 9 | NONE | 925 | 72 MB |
| 26 | 754 | 7 | 754 | 754 | 46 MB |
| 27 | 754 | 11 | NONE | 754 | 72 MB |
| 28 | 699 | 7 | 256 | 699 | 42 MB |
| 29 | 823 | 10 | NONE | 823 | 71 MB |
| 30 | 918 | 7 | 918 | 918 | 55 MB |
| 31 | 1024 | 11 | NONE | 1024 | 98 MB |
| 32 | 1024 | 15 | NONE | 1024 | 133 MB |
| 33 | 1024 | 5 | 1024 | 1024 | 44 MB |
| 34 | 612 | 2 | 128 | 612 | 10 MB |
| 35 | 1024 | 9 | NONE | 1024 | 80 MB |
| 36 | 1024 | 8 | 512 | 1024 | 71 MB |
| 37 | 615 | 8 | 128 | 615 | 42 MB |
| 38 | 987 | 3 | 987 | 987 | 25 MB |
| 39 | 987 | 7 | 987 | 987 | 60 MB |
| 40 | 820 | 6 | 820 | 820 | 42 MB |
| 41 | 977 | 5 | 977 | 977 | 42 MB |
| 42 | 981 | 5 | 981 | 981 | 42 MB |
| 43 | 830 | 7 | 512 | 830 | 50 MB |
| 44 | 830 | 10 | NONE | 830 | 72 MB |
| 45 | 917 | 15 | NONE | 918 | 115 MB |
| 46 | 000 | 00 | 000 | 000 | 00 MB |

# APPENDIX C

## ERRORS REPORTED BY AMI-BIOS

AMI-BIOS performs various diagnostics tests at the time the system is powered up. Whenever an error is encountered during these tests either you hear a few short beeps or see a error display on your monitor.

If the error comes before the display device is initialized, system reports the error by giving (X) short beeps, otherwise error message will be displayed on the screen.

If the error is FATAL then system HALTS after reporting the FATAL error. If the error is NON-FATAL then process continues after reporting the NON-FATAL error.

The following errors are reported by giving (X) short beeps, so that by counting the no. of short beeps, you can identify the error.

| NO. OF BEEPS | MEANING OF ERROR |
|---|---|
| 1 | DRAM refresh failure. |
| 2 | Parity Circuit failure. |
| 3 | Base 64KB RAM failure. |
| 4 | System Timer failure. |
| 5 | Processor Failure. |
| 6 | Keyboard Controller – Gate A20 error. |
| 7 | Virtual Mode Exception Error. |
| 8 | Display Memory R/W Test Failure.(*) |
| 9 | ROM-BIOS Checksum Failure. |

(*) Non-Fatal Error

| Check Point | Meaning |
|---|---|
| 01 | NMI Disabled and 286/386 reg test about to start |
| 02 | 286 Register test over |
| 03 | ROM Checksum OK |
| 04 | 8259 Initialization Ok |
| 05 | CMOS Pending interrupt disabled |
| 06 | Video disabled and system timer counting OK |
| 07 | CH-2 of 8253 test OK |
| 08 | CH-2 delta count test OK |
| 09 | CH-1 delta count test OK |
| 0A | CH-0 delta count test OK |
| 0B | Parity status cleared |
| 0C | Refresh and System timer Ok |
| 0D | Refresh link toggling Ok |
| 0E | Refresh period ON/OFF 50% Ok |
| 10 | Confirmed Refresh ON and start 64k memory test |
| 11 | Address line test OK |
| 12 | 64k Base memory test OK |
| 13 | Interrupt vectors initialized |
| 14 | 8242 Keyboard controller test OK |
| 15 | CMOS Read/Write test OK |
| 16 | CMOS Checksum/battery OK |
| 17 | Monochrome mode set OK |
| 18 | Color mode set OK |
| 19 | About to look optional video ROM |
| 1A | Optional video rom control OK |
| 1B | Display memory read/write test OK |
| 1C | Display memory R/W test for alternate display OK |
| 1D | Video retrace check OK |
| 1E | Global equipment byte set for video Ok |
| 1F | Mode set call for Mono/Color Ok |
| 20 | Video test OK |
| 21 | Video display OK |
| 22 | power on message display Ok |
| 30 | Virtual mode memory test about to begin |
| 31 | Virtual mode memory test started |
| 32 | Processor in virtual mode |
| 33 | Memory address line test in progress |
| 34 | Memory address line test in progress |
| 35 | Memory below 1Mb calculated |
| 36 | Memory size computation OK |
| 37 | Memory test in progress |
| 38 | Memory initialization below 1MB over |
| 39 | Memory initialization over 1MB over |
| 3A | Display memory size |
| 3B | About to start below 1 Mb memory test |
| 3C | Memory test below 1MB OK |
| 3D | Memory test above 1MB Ok |

| | |
|---|---|
| 3E | About to go to real mode (SHUTDOWN) |
| 3F | Shutdown successful and entered in real mode |
| 40 | About to disable GATE A20 address line |
| 41 | GATE A20 line disabled successfully |
| 42 | About to start DMA Controller test |
| 4E | Address line test OK |
| 4F | Processor in real mode after shutdown |
| 50 | DMA page register test OK |
| 51 | DMA unit-1 base register test about to start |
| 52 | DMA unit-1 channel ok,about to begin CH-2 |
| 53 | DMA channel 2 base register test OK |
| 54 | About to test F/F latch for Unit 1 |
| 55 | F/F latch test for both units OK |
| 56 | DMA unit 1 and 2 programmes Ok |
| 57 | 8259 initialization over |
| 58 | 8259 mask register check Ok |
| 59 | Master 8259 mask register Ok |
| 5A | About to check timer and keyboard interrupt level |
| 5B | Timer interrupt Ok |
| 5C | About to test keyboard interrupt |
| 5D | Error..Timer/Keyboard interrupt not in proper level |
| 5E | 8259 interrupt controller error |
| 5F | 8259 interrupt controller test OK |
| 70 | Start of keyboard test |
| 71 | keyboard BAT test ok |
| 72 | Keyboard test OK |
| 73 | Keyboard global data setup OK |
| 74 | Floppy setup about to begin |
| 75 | Floppy setup OK |
| 76 | Hard disk setup about to start |
| 77 | Hard disk setup OK |
| 79 | About to initialize timer data area |
| 7A | Verify CMOS battery power |
| 7B | CMOS battery verification done |
| 7D | About to analyse diagnostics memory test results |
| 7E | CMOS memory size update OK |
| 7F | About to check optional ROM at C000:0 |
| 80 | Keyboard sensed to enable setup |
| 81 | Optional ROM control OK |
| 82 | Printer global data initialization OK |
| 83 | RS-232 global data initialization OK |
| 84 | 80287 check\test OK |
| 85 | About to display soft error messages |
| 86 | About to give control to system ROM at E000:0 |
| 87 | System ROM E000:0 check over |
| 00 | Control given to INT 19, Boot loader |

# APPENDIX D
# SERVICE INFORMATION

Befor contacting our customer support service, please have the information ( problem settlement on next page ) ready.

****** Shipping To Customer Seriver ******

When the corresponding with customer support seriver, refer to the authorizaation number on the packing slip, the purchase order, and any other related documents.

Because the repaired or replacement board will be in the default configuration, return your board in its original state :

1. Put the jumpers in the default positions.
2. Remove all optional equipment, such as expansion cards and the math corprocessor.
3. Disconnect the battery from the real-time clock.
4 Write a note to describe the problem as detail as possible.

Protect the equipment from damage in transit:

1. Place boards in antistatic bags and then in padded shipping bags.
2. Protect the product with protective padding such as flow pack or foam.
3. Write the return authorization number on the outside of the box and label it " FRAGILE".

# INFORMATION OF CUSTOMER'S SYSTEM PROBLEM SETTLEMENT SHEET

TO :_____ ATTN :_____ FAX #RECEPTION : _____

FM :_____ CC :_____ PAGE :_____ OF :_____

DATE :_____/_____/_____ REF NO :_____

1. CUSTOMER DATA

NAME :_____ TEL NO :_____ FAX NO :_____

ADDRESS :_____

CONTACT PERSON : _____

2. SPECIFICATION OF MOTHER BOARD

MODEL NO :_____ SERIAL NO :_____

ON BOARD MEMORY :_____KB. CPU TYPE & BRAND :_____

RAM : TYPE _____KB - _____NS. ☐ DIP ☐ MODULE. BRAND _____

CACHE MEMORY : _____KB. PART NO _____*_____ -____NS.BRAND _____

3. ADD ON CARD

VIDEO : TYPE _____ MODEL NO _____ BRAND _____

CONTROLLER : TYPE _____ MODEL NO _____ BRAND _____

LANCARD : TYPE _____ MODEL NO _____ BRAND _____

4. POWER SUPPLY : _____WATTS. BRAND _____

5. OTHER : _____

6. APPLICATION SOFTWARE : _____

_____

7. DESCRIPTION OF PROBLEM :_____

_____

_____

8. SOLOTION ( SUPPLIER ) :_____

_____

_____